

UNITED STATES DEPARTMENT OF AGRICULTURE

FOREST SERVICE

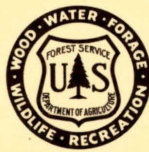
5150 Fuels Reduction

Report

Cotton Flats Broadcast Burn

Rincon Broadcast Burn

Alpine R.D. Nov. 1970 Apache N. F.



BROADCAST BURN REPORT

ALPINE RANGER DISTRICT  
APACHE NATIONAL FOREST

<u>Name of Project</u>	<u>Size of Projects (acres)</u>	<u>Location of Projects</u>
Cotton Burn	455 acres	Portions of Secs. 4,5,8,9 T5N, R31E
Rincon Burn	330 acres	Portions of Secs. 14, 23 T4 $\frac{1}{2}$ N, R30E Secs. 31 & 32, T5N, R30E
124 Burn	<u>202 acres</u>	Sec. 35, T5N, R28E
TOTAL	987 acres	

Report Prepared by:

Dick Connell

Date 3/16/71

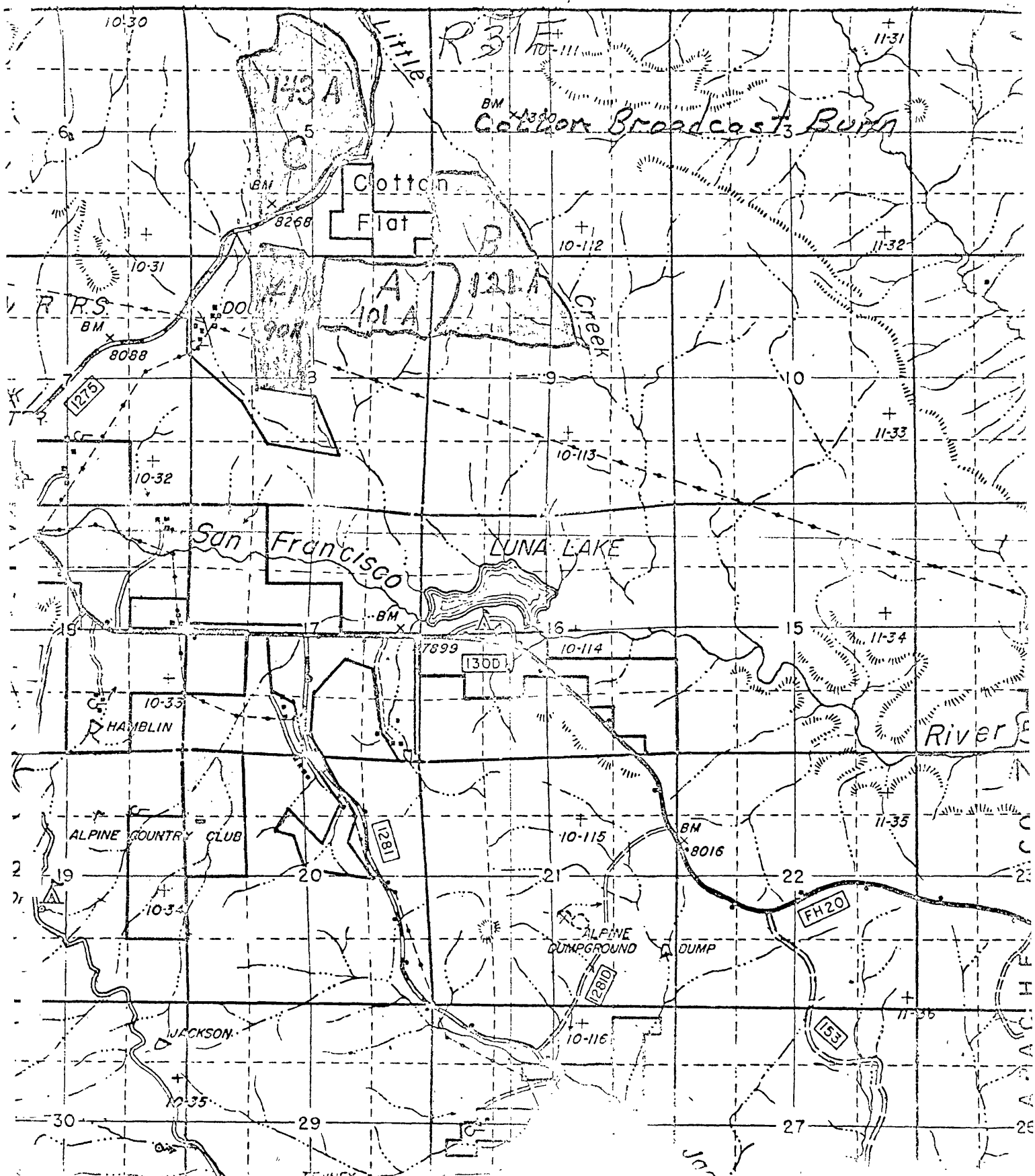
Acreage Burned in Prescribed Broadcast Burns 1970

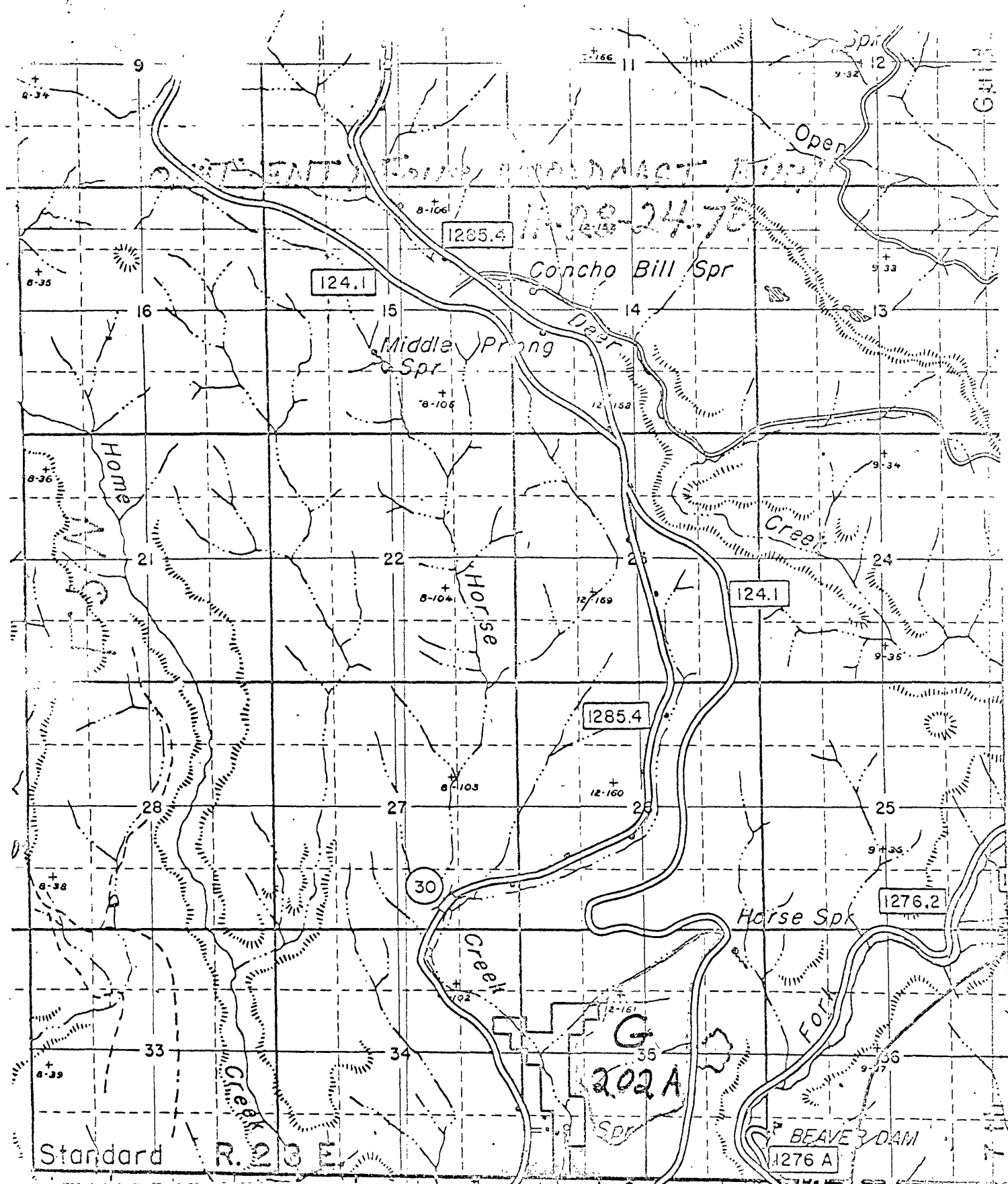
Cotton Burn - Block A	101 acres
Block B	121 acres
Block C	143 acres
Block A-1	<u>90 acres</u>
Total -	455 acres

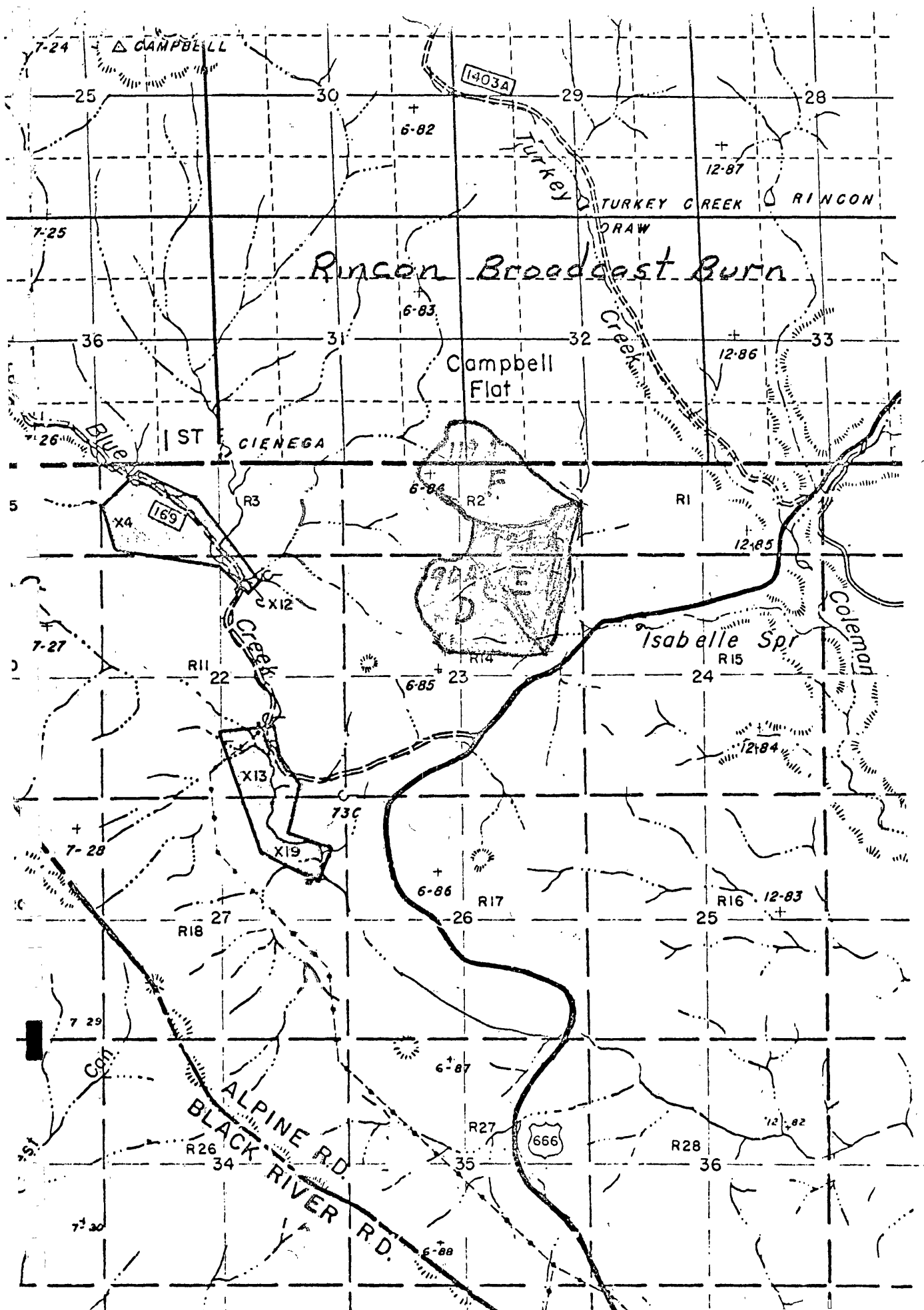
Rincon Burn - Block D	90 acres
Block E	121 acres
Block F	<u>119 acres</u>
Total -	330 acres

One Twenty Four Burn - Block G      202 acres

Total of All Three Burns = 987 acres







# I. MANAGEMENT OBJECTIVES TO BE MET (Be Specific)

## Plan Section

1. Reduce fine fuels by 80% (1" & under)
2. Reduce medium fuels by 40% (1 -- 3")
3. Reduce heavy fuels by 10%, and scroch remainder
4. Hold Scroch and mortality in residual stand to an acceptable level
5. Reduce fire hazard for a three to four year period. Specifically concerned with initiating fires.
- 6.

## Report Section

	Fully Met (✓)	Partly Met (✓)	Not Met (✓)
1.	X		
2.		X	
3.	X		
4.	X		
5.	X		
6.			

If objectives were "Not Met," please attach explanation. If burn escaped control, please show escape on map and explain what happened.

## II. PROJECT DESCRIPTION

### A. Fuels (Refer to SWIFCO Guide, Chapter 2, Section A)

1. Principal vegetative species to be burned: Ponderosa Pine

2. For logging slash, <sup>& thinning,</sup> time after timber is cut before  
burning: \_\_\_\_\_  
(months) Cotton 36-48 months  
Rincon 24-48 months  
124 24 months

3. For live vegetation to be burned, check condition most  
description of desired state:

Growing NA Dormant \_\_\_\_\_

Cured \_\_\_\_\_

4. Percent of dead fuels 100%

5. Physical characteristics

a. Size (check most appropriate):

(1) Generally small to medium branchwood

(a) With fines \_\_\_\_\_

(b) Without fines X

(2) Both large and small logging slash X

(3) Grass and forbs

(a) Mixed with brush \_\_\_\_\_

(b) Not mixed with brush X

(4) Grass only \_\_\_\_\_

(5) Other (describe): \_\_\_\_\_



b. Arrangement (check most appropriate)

- (1) Compact or dense \_\_\_\_\_ X \_\_\_\_\_  
(2) Loose or not dense \_\_\_\_\_

c. Continuity (check most appropriate):

- (1) Will carry fire \_\_\_\_\_ X \_\_\_\_\_  
(2) Will not carry fire \_\_\_\_\_  
    (a) But grasses will \_\_\_\_\_  
    (b) And grasses will not \_\_\_\_\_  
(3) For debris:  
    (a) Continuous \_\_\_\_\_  
    (b) Scattered \_\_\_\_\_  
(4) Other (describe): \_\_\_\_\_

B. Topography (Refer to SWIFCO Guide, Chapter 2, Section C )

1. Aspect: Primarily East, with some Southeast, South.  
    NE, SW, etc.  
2. Position on slope:           Upper 1/3 Rincon & 124  
    Middle 1/3 \_\_\_\_\_ Lower 1/3 Cotton  
3. Steepness of slope: 0-15 %  
4. Shaping of airflow (describe any topographic features,  
    their expected effects, and any special precautions to be  
    taken).

C. Category of Burn Decided Upon (check one)

1. Burning of piled debris (Refer to SWIFCO Guide,  
    Chapter 6)  
    a. In timber \_\_\_\_\_  
    b. In pinyon-juniper \_\_\_\_\_

- c. Other (describe)\_\_\_\_\_
2. Broadcast burning (Refer to SWIFCO Guide, Chapter 7)
- a. Chaparral\_\_\_\_\_
- b. Clearcut timber patches\_\_\_\_\_
- c. Timber understory\_\_\_\_\_X\_\_\_\_\_
- d. Pinyon-juniper invasions\_\_\_\_\_
- e. Panhandle grasslands\_\_\_\_\_
- f. Other (describe)\_\_\_\_\_

### III. KEY PRESCRIPTION ELEMENTS

(Refer to SWIFCO Guide, Chapter 6 for piled debris and to Chapter 7 for broadcast burns for recommendations for each element.)

#### A. Reasons for Choice of Method

(List reasons why category of burn has been chosen.)

#### B. Pretreatment Plan

(List pretreatment measures to be taken, including widths of control lines.)

Treatment areas were divided into blocks approximately 100 acres in size. Control lines were established around perimeter of all blocks - width of line one JD 350 blade (4').

#### Report Section - Report any departures from planned pretreatment.

Control lines on 124 Block were constructed with plow unit on JD 350. This one - two foot line was sufficient to contain fire. Line patrol must be increased with this narrow of a line.

## C. Firing Plan

1. Patterns and Timing (List firing method(s) as described in SWIFCO Guide, Chapter 2, Section II. B. and sequences. Example: "(1) Backing fire from N to S along main ridge, followed by (2) flank fires down both N and S flanks, held to progress with the backing fire.")

Backing fires were used on all blocks. In most cases fires were backed into the prevailing wind, wind in all cases was the dominant factor influencing fire behavior. Wind changes caused considerable difficulties. Most heavy scroch areas were resultant of variable or gusty local wind conditions.

2. Complete: Type and quantity of ignition devices needed:

Type Drip Troches Quantity 1-2 per block

3. Complete: This burn will require a Firing Boss

Dick O'Connell and 3 men.  
Name Number

4. Number of radios<sup>2/</sup> needed for firing crew 1.

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<sup>2/</sup>Firing crew and holding crew to be on same frequency.

Report Section - Report any departures from planned firing and reasons.

D. Holding Force Holding force was not required. Ignition crew patrolled lines and picked up any slop overs.

1. Name of Fire Boss \_\_\_\_\_

2. Number of personnel:

Plan Section

a. On downwind side \_\_\_\_\_

b. On upwind side \_\_\_\_\_

c. On each flank \_\_\_\_\_

3. Number of radios<sup>2/</sup> needed \_\_\_\_\_

4. List of holding and mop up equipment needed:

Report Section  
(Actual)

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

E. Season to Burn

Approximate date burning is expected

to begin First week in November

Report Section

Actual Date:

November 3,4,5,6,9,10,16,17, 1971

December 3,4, 1971

F. Fire Danger Criteria

1. If criteria on graphs from SWIFCO Guide, Chapters 6 or 7 are to be used, complete:

Plan Section  
(Desired Criteria)  
From To

Fuel stick moisture 20%

Relative humidity 10 25%

Windspeed steady 5-10 mph

Temperature (max.) 55 60

Temperature (min.) 40 45

(During burning  
period)

Report Section  
As Actually Observed

(See weather data sheets)

2. If graph criteria not used, list criteria:

Report Actual

# FIRE WEATHER DATA AT BURN SITE

Rincon

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
10/21/70	1600	52		44%				
	1800	42		73%				
	max	60		100%				
	min	32		32%				
	1000	64		54%				
	1200	60		48%				
	1400	61		54%				
	1600	62		72%				
	1800	42		100%				
	max	(1100) 58		100%				
	min	24		29%				

# FIRE WEATHER DATA AT BURN SITE

Rincon

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
10/23/70	1000	55		30%				
	1200	55		26%				
	1400	54		34%				
	1600	52		36%				
	1800	40		46%				
	max	(0900) 68		100%				
	min	22		26%				
10/24/70	1000	62		40%				
	1200	58		42%				
	1400	52		44%				
	1600	48		52%				

Pinson

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
10/24/70	1800	42 (1100)		80%				
	max	64		100%				
	min	28		34%				
10/25/70	1000	63		32%				
	1200	52		38%				
	1400	50		40%				
	1600	46		50%				
	1800	42 (1000)		74%				
	max	63						
	min	34						
10/26	Illegible readings							



# FIRE WEATHER DATA AT BURN SITE

*Pince*

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
10/27/70	1600	40		50%	remainder	11/eg. 5/		
	1800	28		55%				
10/28/70	1000	52		30%				
	1200	54		24%				
	1400	52		24%				
	1600	54		32%				
	1800	30		45%				
	max	59		100%				
	min	22		24%				

FIRE WEATHER DATA AT BURN SITE

Rincon

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
10/29/70	1000	67		50%				
	1200	60		50%				
	1400	62		54%				
	1600	62		74%				
	1800	42		100%				
	max	67						
	min	22						
10/30/70	1000	70		44%				
	1200	70		40%				

# FIRE WEATHER DATA AT BURN SITE

Cotton

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
11/2/70	1430	59		11%		4-5	N-E	Fair - poor consumption on medium fuels
	1530	51 <del>42</del>		14%		2-3	North	Fair
	1730	40		39%		Breeze	N-E	Poor spread Secured for night
11/3/70	1140	50		26%		3	East	Started Burn Fair results
	1340	53		34%		6	SE	Fair
	1600	49	37	34%		Breeze	SE	Slow spread
	1730	42	34	48%		none		Poor Secured for night
11/4/70	1000	43	36	55%			East	(taken @ alpine)
	1100	48	38	43%		2-3 mph	S-SE	Poor spread RH too high
	1410	52	40	37%		3-6	SE	Poor backing in light fuels
	1610	45	36	45%		0-2	SE	Poor backing

## FIRE WEATHER DATA AT BURN SITE

Cotton

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
11/5/70	1450	57	42	30%		3-7	SW	Fair spread in all fuels
	1535	56	42	33%		5	SW	"
11/6/70	1315	60	43	26%		6-8	SW	Good spread
	1350	62	44	24%		6-10	SW	Fast spread with wind
	1500	57	42	30%		3-6	SW	Good burn down on S. & medium fu.
11/10/70						8-12	West	down slope

FIRE WEATHER DATA AT BURN SITE

Rincon

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
11/9/70	1400	57	38	14%		Gusty 4-6	S-E	good
	1450	56	38	17%		0-5	S-E-E	good
	1530	54	37	18%		1-6	S-E-E	good
	1600	53	37	21%		1-3	E	good
	1700	44	32	27%		0-2	S-E	fair
	1730	41	30	28%		0-2	S-E	Fire stopped backing
11/10/70	1100	56	38	17%		2-6	west	good
	1200	58	39	16%		2-7	S-W	good
	1300	58	39	16%		2-6	S-W	good
	1400	57	39	18%		2-4	S-W	good
	1500	55	38	20%		2-5	variable	good

## FIRE WEATHER DATA AT BURN SITE

Lincoln

[illegible]

Rincon

[illegible]

# FIRE WEATHER DATA AT BURN SITE

Rincon

Date	Hours	Dry Bulb Temp.	Wet Bulb Temp.	Humidity	Ground Moisture Depth	Wind		Burn Results
						Speed	Direction	
11/17/72	1000	54	35	10%		7	WW	
	1100	58	38	12%		10	"	
	1200	61	40	12%		12	"	
	1300	62	41	14%		8	"	
	1400	63	42	15%		7 1/2	"	
	1500	59	39	14%		4	"	Good
	1600	51	38	32%		0		
	1645	52	35	15%		0-3	NW	Poor



#### MORTALITY SUMMARY

1. Sixty-five (65%) percent of all mortality was obtained in suppressed stems.
2. Thirty-five (35%) percent of all mortality was obtained in intermediate stems. This was primarily found in the unthinned block where the flame front had a "stair step" of aerial fuels.
3. No mortality was found in the sampled trees in the dominant or co-dominant classification.
4. Seventy-five (75%) percent of all mortality was found in the 0-3" DBH size class.
5. Twenty-four (24%) percent of all mortality was found in the 4-6" DBH size class.
6. One percent (1%) of all mortality was found in the 7-9" DBH size class.
7. No mortality was found in trees over 9" in diameter.
8. Sixty-six percent (66%) of all trees sampled showed some degree of crown scroch.
9. Thirty-six percent (36%) of all trees sampled were scroched but will survive.
10. Twenty-two percent (22%) of all trees sampled were scroched and are expected to die.
11. Eight percent (8%) of all trees sampled were killed outright by the flame front.

Cotton Burn

Block a

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		4	2	2	8
Suppressed	2	1	1	1	5
<u>4-6" DBH</u>					
Dominant					
Co-Dominant					
Intermediate			5	6	11
Suppressed		1			1
<u>7-9" DBH</u>					
Dominant					
Co-Dominant					
Intermediate			1	3	4
Suppressed					
<u>Over 9" DBH</u>					
Dominant					
Co-Dominant				1	1
Intermediate					
Suppressed					
<u>TOTAL</u>	2	6	9	13	30

Basal Area 50

Date of Burn 11/70

Sample Size 1/20 Hc 26.3' r

Date of Inventory 1/12/71

Cotton Flat Burn

Block B

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		1	5		6
Suppressed	2	2	2		6
<u>4-6" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		2	19	3	24
Suppressed	1	2			3
<u>7-9" DBH</u>					
Dominant				1	1
Co-Dominant			1	2	3
Intermediate					
Suppressed					
<u>Over 9" DBH</u>					
Dominant					
Co-Dominant					
Intermediate					
Suppressed					
<u>TOTAL</u>	3	7	27	6	43

Basal Area \_\_\_\_\_

Date of Burn 11/70

Sample Size 1/20 Hc 26.3' r

Date of Inventory 1/12/71

# Cotton Flat

Block C

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
Dominant					
Co-Dominant					
Intermediate			2	3	5
Suppressed	1	2	1		4
<u>4-6" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		2	3	15	20
Suppressed	1				1
<u>7-9" DBH</u>					
Dominant					
Co-Dominant					
Intermediate			2	1	3
Suppressed					
<u>Over 9" DBH</u>					
Dominant					
Co-Dominant				2	2
Intermediate			2	2	4
Suppressed					
<u>TOTAL</u>	2	4	10	23	39

Basal Area 85

Date of Burn 11/70

Sample Size 1/20 Hc 26.35

Date of Inventory 1/12/71

Rincon Burn Burn 11/70

Block 0

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>		2	3	1	6
<u>Suppressed</u>	2	2	1		5
<u>4-6" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>			2	4	6
<u>Suppressed</u>		1	2		3
<u>7-9" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>				4	4
<u>Suppressed</u>					
<u>Over 9" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>				4	4
<u>Intermediate</u>			2	2	4
<u>Suppressed</u>					
<u>TOTAL</u>	2	5	10	15	32

Basal Area 100

Date of Burn 11/70

Sample Size 120 Hc.

Date of Inventory 1/13/71

Rincon Burn Burn 11/70

Block E

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>	1	1	2	5	9
<u>Suppressed</u>	1	4			5
<u>4-6" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>	2		6	5	13
<u>Suppressed</u>					
<u>7-9" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>					
<u>Intermediate</u>				3	3
<u>Suppressed</u>					
<u>Over 9" DBH</u>					
<u>Dominant</u>					
<u>Co-Dominant</u>				1	1
<u>Intermediate</u>					
<u>Suppressed</u>					
<u>TOTAL</u>	4	5	8	14	31

Basal Area 70

Date of Burn 11/70

Sample Size 120 Ac

Date of Inventory 1/13/71

Rincon Burn Burn

Block

B E (unthinned)

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		8	5	4	17
Suppressed	4	18	13		35
<u>4-6" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		5	6	2	13
Suppressed	2		1		3
<u>7-9" DBH</u>					
Dominant					
Co-Dominant				2	2
Intermediate					
Suppressed		1			1
<u>Over 9" DBH</u>					
Dominant					
Co-Dominant				2	2
Intermediate				1	1
Suppressed					
<u>TOTAL</u>	6	32	25	11	74

Basal Area 70

Date of Burn 11/70

Sample Size Yaelle

Date of Inventory 1/13/71

Block 124

1/12/71

	Dead	Scroched Will Die	Scroched Will Live	No Scroch	Total
<u>0-3" DBH</u>					
Dominant					
Co-Dominant					
Intermediate		1			1
Suppressed	1	2	6	3	12
<u>4-6" DBH</u>					
Dominant					
Co-Dominant					
Intermediate				4	4
Suppressed	1		1	2	4
<u>7-9" DBH</u>					
Dominant					
Co-Dominant			1	2	3
Intermediate			1	4	5
Suppressed					
<u>Over 9" DBH</u>					
Dominant					
Co-Dominant				1	1
Intermediate			1	1	2
Suppressed					
<u>TOTAL</u>	2	3	10	17	32

Basal Area 90Date of Burn 11/70Sample Size 1/20 HcDate of Inventory 1/12/71



## Apache NF

October 19, 1970

TO: District Ranger, Alpine RD

The Cotton Flat area has a sandy loam soil derived from a basalt and sandstone origin. This soil has a moderate erodibility and a low erosion hazard. The soil structure and the litter present makes it resistant to erosion. If the prescribed fire consumed the litter present, some sheet erosion may occur on steeper slopes. For a 5-year storm with a 30 minute precipitation, the critical distance before mass erosion starts on exposed soils on a 10 percent slope is around 80 feet. On fuel break lines exceeding this criteria, I would recommend seeding.

The Rincon area has a gravelly silt loam derived from the Sponseller soil series. The soils on this area have a low erodibility with a low erosion hazard. The critical distance of exposed soils on a 10 percent slope on this site with the same storm type as above is approximately 1200 feet.

Curt M. Johnson  
CURT M. JOHNSON  
Forester (Watershed)

[illegible]




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Thinning slash plus logging slash - fire will be hot resulting in heavy scroch.




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Heavy thinning slash under young pole stand. Scroch can be expected to be light with backing fire. Head fire will result in heavy scroch and mortality.



U.s. Weather Bureau's Mobile Fire Weather Unit is available for on site readings and forecasts. This unit was used on Three Forks Burn, 7/67.





Good backing fire under small  
pole size stand - Cotton Burn



Close up of ground fuels prior  
to burn - Note quarter on rock





Post burn shot of same area as above - Note same rock and quarter  
Excellent consumption of fine and medium size fuels



Gary Slaughter using drip torch laying ignition strip. Light fuels with young sparse overstory cured grass carried fire well under low RH (10-20%)



Good backing fire on heavy thinning slash fuels. Note density of residual stand in background. Good consumption, very little scorch to stand.



Typical fuels and overstory stand. Flame height about one foot. Snow damage trees on left killed.





General view showing  
backing fire with low  
flame height.



Close up of same area as  
above during burn - Note  
rock in upper left corner  
for reference in next phot



Post burn shot of same  
area as above - Note rock  
again excellent consumptio  
of fine and meduim fuels.





Post burn view of dense young pine stand. Note closeness of canopy to ground. Some lower branches will show scorch. No mortality is anticipated.





One Twenty Four - Post Burn - Backing fire down moderate slope resulted in good consumption of fine fuel with almost no scorch.



Rincon - Post Burn - Little scorch was obtained in thinned stands with higher canopies.





Post Burn Rincon, Block F - Burning in unthinned stand resulted in stair stepping of fire head into higher canopies, resulting in heavy scorch and mortality.



Post Burn, Rincon - Thinned but still overstocked stand was burned with very cool backing fire - good consumption of fine fuels but poor consumption on medium fuels (1-3"). Very little Scorch.





Cotton - Post Burn - Backing fires resulted in cool low flame fronts, with little scroching.



Cotton - Post Burn - Wind change here resulted in head fire which caused increased scroch.



One Twenty Four Post Burn - Photo taken two months after burn -  
Very light scorch, fine fuel 80% consumed.



Cotton Post Burn - Large pole stand, no scorch obtained in  
Dominants or Co-dominants.